Location Standards for RCRA Treatment, Storage, and Disposal Facilities (TSDFs)

BACKGROUND: **Section 3004(o)(7) of the Resource Conservation and Recovery Act (RCRA) authorized the Environmental Protection Agency (EPA) to promulgate standards for the location of hazardous waste Treatment, Storage, and Disposal Facilities (TSDFs). These standards were published on January 12, 1981. The standards specify requirements regarding floodplains and seismic considerations for permitted facilities regulated under 40 Cods of Federal Regulations (CFR) 264.**

The 1984 passage of the Hazardous and Solid Waste Amendments (HSWA) to RCRA required EPA to promulgate prohibitions, applicable to permitted and interim status facilities, on the placement of hazardous; waste in salt dome formations, salt bed formations, and underground mines or caves; publish guidance criteria for the location of TSDFs identifying areas of vulnerable hydrogeology; and develop revised criteria for the acceptable location of new and existing TSDFs as necessary to protect human health and the environment. EPA fulfilled the first two requirements and plans to propose revised criteria for the acceptable location of TSDFs in the near future. This Information Brief describes the siting criteria applicable to the location of TSDFs until additional location criteria are promulgated.

STATUTE: **RCRA Sections 3004(e), 3004(b), 3004(o), and 3005(c)(3).**

REGULATIONS: **10 CFR 960, "General guidelines for the recommendation of sites for nuclear waste repositories."**

40 CFR 264, "Standards for owners end operators of hazardous waste treatment, storage, and disposal facilities," Section 264.18.

40 CFR 265, "Interim status standards for owners and operation of hazardous waste treatment, storage, and disposal facilities," Section 265.18.

40 CFR 270, "EPA administered permit programs: The Hazardous Waste Permit Sections 270.14(b)(11) and 270.32(b)(2).

REFERENCES:

1. "Hazardous Waste Management System: Addition of General Requirements for Treatment, Storage, and Disposal Facilities," 40 CFR Part 264, 46 *FR* 2810-2818, January 12, 1981.

2. "Daily Congressional Record," October 11, 1984, pp. 514341 - 514342.

3. "Permit Writers' Guidance Manual for Hazardous Waste Land Storage and Disposal Facilities, Phase I: Criteria for Location Acceptability and Existing Applicable Regulations," OSWER Policy Directive 9472.00-1, NTIS Document PB 86-125, 580/AS, February 1985.

4. "Criteria for Identifying Areas of Vulnerable Hydrogeology Under RCRA: Statutory Interpretative Guidance," U.S. Environmental Protection Agency, NTIS Document PB 86-224953, July 1986.

5. "Model RCRA Permit for Hazardous Waste Management Facilities," U.S. Environmental Protection Agency, NTIS Document PB 90-210998, September 1988.

6. "Radioactive Waste Management," DOE Order 5820.2A, September 26, 1988.

7. "Environmental Protection Agency Proposal to Broaden Restrictions for the Siting of RCRA Hazardous Waste Facilities," EH-231 Memorandum, March 13, 1989.

What RCRA seismic standard is applicable to the location of permitted hazardous and Radioactive Mixed Waste (RMW) management units and facilities?

Areas of permitted waste management units and facilities where treatment, storage, or disposal of hazardous waste or RMW will be conducted cannot be located within 61 meters (200 feet) of a fault that has experienced displacement (movement) any time during the Holocene epoch (the most recent geologic past) [40 CFR 264.18(a)(1)].

- A fault is defined as a fracture along which rocks on one side have been displaced with respect to those on the other side [40 CFR 264.18(a)(2)(i)].
- Displacement is defined as the relative movement of any two sides of a fault, measured in any direction [40 CFR 264.18(a)(2)(ii)].
- Holocene is defined as the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present [40 CFR 264.18(a)(2)(iii)]. The Holocene period includes the past 11,000 years.

How must DOE demonstrate compliance with the RCRA seismic standard?

To demonstrate compliance with this standard, DOE permit applicants must identify the political jurisdiction in which the facility is to be located.

- ❑ If the facility is not located in one of the political jurisdictions listed in 40 CFR 264 Appendix VI, no further information is required to demonstrate compliance with the seismic standard [40 CFR 264.18(a)]. 40 CFR 264 Appendix VI lists political jurisdictions, by State, that are most likely to experience seismic activity. This list currently contains jurisdictions in 12 western States, and includes the entire States of California and Nevada [270.14(b)(11)(i)].

- ❑ If the facility is located in a political jurisdiction listed in 40 CFR 264 Appendix VI, DOE permit applicants must demonstrate compliance with the seismic standard using published geologic data or data obtained from field investigations [40 CFR 270.14(b)(11)(ii)]. The information submitted must either show that

    - no faults that have had displacement during the Holocene epoch are present within 900 meters (3,000 feet) of the facility, or

    - no faults that have had displacement during the Holocene epoch pass within 61 meters (200 feet) of the portions of the facility where treatment, storage, or disposal of hazardous waste or RMW will be conducted. (This demonstration must be based on data from a comprehensive geologic analysis of the site.)

What RCRA floodplain standard is applicable to the location of permitted hazardous waste and RMW management units and facilities?

A hazardous waste or RMW management unit or facility located in a 100-year floodplain (a land area that is subject to a one percent or greater chance of flood in any given year from any source [40 CFR 264.18(b)(2)(i)]) must be designed, constructed, operated, and maintained to prevent the washout of any hazardous waste by a 100-year flood (a flood that has a one percent chance of being equalled or exceeded in any given year [40 CFR 264.18(b)(2)(iii)]), unless the owner or operator can demonstrate to EPA or authorized State the following:

- ❑ Procedures are in effect that will allow the waste to be moved to a location where it will not be vulnerable to flood waters, before flood waters can reach the facility, or

- ❑ for existing surface impoundments, landfills, waste piles, land treatment units, and miscellaneous units, washout will cause no adverse effects on human health and the environment. This determination will be made taking the following into consideration:

    - the volume and physical and chemical characteristics of the waste at the facility;

    - the concentration of hazardous constituents at the facility that would potentially affect surface waters as a result of washout;

    - the effect of such concentrations on the current or potential uses of, and water quality standards established for, the affected surface waters; and

    - the effect of the hazardous constituents at the facility on the sediments of affected surface waters or the soils of the 100-year floodplain that could result from a washout [40 CFR 264.18(b)(l)(i)-(ii)].

What information must be provided in RCRA Part B permit applications to demonstrate compliance with the floodplain standard?

Owners and operators of all facilities submitting a RCRA Part B permit application must identify whether the facility is located within a 100-year floodplain, the source of data for the determination, the 100-year flood level, and any other special flooding factors (such as wave action) that must be considered in designing, operating, or maintaining the facility to withstand washout from a 100-year flood [40 CFR 270.14(b)(11)(iii)].

Owners and operators of facilities located in a 100-year floodplain must provide the following information in their Part B application:

an engineering analysis indicating the hydrodynamic and hydrostatic forces expected to result from a 100-year flood, and

- ❑ structural or engineering studies showing how the design of operational units and flood protection devices (e.g., floodwalls, dikes) will prevent washout, or

- ❑ a description of the procedures to be followed to remove hazardous waste to safety before the facility is flooded including

  - a discussion of the timing of waste removal to show that it can be accomplished before flood waters reach the facility, and

  - a description of the locations to which the waste will be removed to demonstrate that those facilities will be eligible to receive hazardous waste in accordance with the regulations under 40 CFR 124, 264 through 266, 270 and 271 [40 CFR 270.14(b)(11)(iv)].

What restrictions do the RCRA location standards place on the use of salt dome formations, salt bed formations, and underground mines or caves for waste storage and disposal at interim status and permitted facilities?

The placement of hazardous waste or RMW in salt dome formations, salt bed formations, or underground mines or caves is prohibited at RCRA interim status facilities [40 CFR 265.18]. Further, the placement of noncontainerized or bulk liquid hazardous waste or RMW in salt dome formations, salt bed formations, or underground mines or caves is prohibited at permitted RCRA facilities [40 CFR 264.18(c)].

Section 3004(b) of RCRA, however, specifically exempts DOE's Waste Isolation Pilot Project (WIPP), located in New Mexico, from location restrictions pertaining to the use of salt dome formations, salt bed formations, and underground mines or caves for hazardous waste storage and disposal. Congress exempted the WIPP from these requirements because the facility was judged to contain controls providing greater protection of human health and the environment than those required under Section 3004(b) of RCRA (reference 2). This exemption is codified in 40 CFR 265.18 for interim status facilities and 40 CFR 264.18(c) for permitted facilities.

Which DOE Orders govern the location of DOE's hazardous waste and RMW management facilities?

The location of facilities for the disposal of DOE's high-level, transuranic, and low-level RMW is governed internally by DOE Order 5820.2A, Radioactive Waste Management. In addition, 10 CFR 960 provides guidelines for the siting of high-level waste repositories.

- ❑ High-level RMW must be disposed of in a geological repository meeting the requirements of the Nuclear Waste Policy Act of 1982. Interim storage facilities for high-level RMW awaiting transport to the repository must also meet the Act's requirements (DOE 5820.2A pages I-7 to I-8).

- ❑ Transuranic RMW meeting the waste acceptance criteria of the WIPP are to be sent to that facility for disposal (DOE 5820.2A page II-l).

- ❑ According to DOE Order 5820.2A, treatment and disposal facilities for low-level RMW must meet the following radiological performance standards:

  - Low-level waste should be disposed of at the site at which it is generated, if practicable, or if on-site disposal is not available, at another DOE facility (page III-1).

  - External exposure to the waste and concentrations of radioactive material that may be released into the surface water, ground water, soil, plants, and animals must not result in an effective dose exceeding 25 mrem/yr to any member of the public. Releases to the atmosphere must meet the requirements of air emissions regulations in 40 CFR Part 61. Efforts must be made to maintain releases of radioactivity in effluents to the general environment at a level as low as is reasonably achievable (page III-l).

  - The committed effective dose equivalents received by individuals who inadvertently may intrude into the facility after the loss of active

institutional control (100 years) must not exceed 100 mrem/yr for continuous exposures or 500 mrem for single, acute exposures (page 111-2).

- Field organizations must prepare and maintain site-specific radiological assessments to demonstrate compliance with these low-level RMW performance standards (page 111-2).

In addition, DOE is required to select low-level RMW disposal sites in conjunction with the National Environmental Policy Act (NEPA) process and to consider the following:

- ❑ hydrogeologic characteristics,
- ❑ the potential for natural hazards (such as floods, erosion, tornadoes, earthquakes, and volcanoes), and
- ❑ the effect upon current and projected populations, land use resource development plans and nearby public facilities, accessibility to transportation routes, and the location of waste generation (DOE 5820-2A pages III-7 to III-8).

What is RCRA's "omnibus" provision and how may this provision affect facility siting, location, and permits?

Under the authority of Section 3005(c)(3) of RCRA, permit writers can add terms and conditions to permits that are not reflected in 40 CFR Part 264 or Part 270 regulations, if they determine that these additional terms or conditions are necessary to protect human health and the environment. This is referred to as the RCRA "omnibus" provision. This statutory provision was codified in 40 CFR 270.32(b)(2) of the RCRA permit regulations. However, permit writers are required to explain the basis or rationale for adding such terms and conditions to permits in the Statement of Basis or Fact Sheet accompanying the permit, and document this information in the permit's Administrative Record (reference 4).

The legislative history pertaining to the "omnibus" provision suggests that this provision can be used to add conditions to permits that reflect proposed or pending regulations. Consequently, with respect to the location standards, permit writers may attempt to use the omnibus provision to consider additional location criteria identified in EPA documents issued in conjunction with the preparation of revised location standards. Location criteria contained in EPA guidance documents are briefly described below.

- ❑ *Criteria for Identifying Areas of Vulnerable Hydrogeology Under RCRA: Statutory Interpretive Guidance* considers hydrogeology to be vulnerable when ground water travel time along any 30-meter (100-foot) flow path from the edge of an engineered containment structure is less than approximately 100 years (reference 4).
- ❑ *Permit Writers Guidance Manual for Hazardous Waste Land Storage and Disposal Facilities* identifies four criteria, aside from hydrogeology, to be considered in evaluating facility location. These criteria are: (1) the amenability of the site to characterization, (2) the ability of the site to provide a stable foundation for an engineered containment structure, (3) the ability to monitor ground water flow paths at the site, and (4) the ability of the facility to comply with statutes applicable to federally protected land resource values. Such statutes include The Wild and Scenic Rivers Act, The National Historic Preservation Act of 1966, The Endangered Species Act, The Coastal Zone Management Act, and The Fish and Wildlife Coordination Act (reference 3).

EPA guidance to RCRA permit writers notes that they may require that extensive, site-specific investigations be performed to justify the location of facilities in areas that do not meet the criteria described in EPA guidance documents. Permit writers may also insert special conditions (such as more frequent facility inspections, special operating restrictions, or construction of thicker floors or liners) into permits for facilities located in areas that are identified as sensitive locations (e.g., Karst terrain) (reference 4).

Questions of policy or questions requiring policy decisions will not be addressed in EH-231 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject matter covered in this Information Brief to Jerry Coalgate, RCRA/CERCLA Division, EH-231, 202-586-6075.